

# RESPIRATORY PROTECTION

**Prepared by:**

**Workplace Safety Consultation Unit**

**Minnesota Department of Labor and Industry**

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# OSHA's Respiratory Protection Standard 29 CFR 1910.134

- This standard applies to General Industry (Part 1910), Shipyards (Part 1915), Marine Terminals (Part 1917), Longshoring (Part 1918), and Construction (Part 1926).
- The effective date of this standard was 4/8/98

# Respiratory Protection Use

- Respiratory Protection – With proper selection, they can be used to control breathing of air contaminated with harmful levels of:
  - Dust
  - Fumes
  - Mists
  - Vapors
  - Gases
- With proper selection, they may also be used to protect against oxygen deficient atmospheres.

# When Does OSHA Require the Use of Respiratory Protection?

- When an employee is exposed to an air contaminant at a level exceeding applicable Permissible Exposure Limits (PEL's), and
  - (1) Employer is in the process of installing feasible engineering controls (general or local exhaust ventilation) to reduce exposure to below PEL's, or
  - (2) When engineering controls are not feasible in an effort to reduce exposures to levels below applicable PEL's.

# When Does OSHA Require the Use of Respiratory Protection?

- When MNOSHA can show an employee exposure to an air contaminant is at a hazardous level where no MNOSHA PEL exists for that air contaminant.

## Example:

- MNOSHA has no established PEL for 2-butoxyethyl acetate (CAS 112-07-2).
- The American Conference of Industrial Hygienists (ACGIH) recommends a Threshold Limit Value (TLV) for employee exposure to 2-butoxyethyl acetate of 20 ppm as a TWA.
- To protect the health of employees, MNOSHA can require an employer to keep employee exposures to 2-butoxyethyl acetate below 20 ppm as a TWA. This should be accomplished with engineering controls, where feasible. Where engineering controls are not feasible, or while they are in the process of being installed, use of respirators by affected employees would be required.

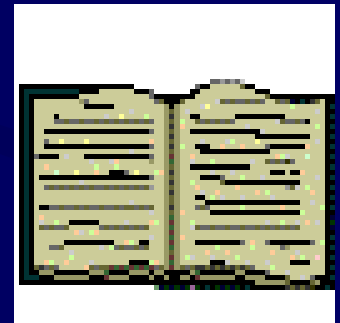
# Format of the Respiratory Protection Standard

- (a) Permissible practice
- (b) Definitions
- (c) Respirator program
- (d) Selection of respirators
- (e) Medical evaluation
- (f) Fit testing
- (g) Use of respirators
- (h) Maintenance and care
- (i) Breathing air quality & use
- (j) Identification of filters, cartridges and canisters
- (k) Training and information
- (l) Program evaluation
- (m) Recordkeeping
- (n) Dates
- (o) Appendices (mandatory)
  - A: Fit Testing Procedures
  - B-1: User Seal Checks
  - B-2: Cleaning Procedures
  - C: Medical Questionnaire
  - D: Information for Employees Wearing Respirators When Not Required Under the Standard

## 29 CFR 1910.134(c)

# Written Respiratory Protection Program Must Address:

- Procedures for respirator selection
- Medical evaluation provisions
- Fit-testing procedures
- Usage procedures
- Cleaning procedures and schedules
- Procedures to ensure adequate air quality



## 29 CFR 1910.134(c)

# Written Respiratory Protection Program Must Address (continued):

- Training on the respiratory hazards to which employees are potentially exposed.
- Training on the proper use and care of the provided respirators.
- Evaluation procedures to ensure effectiveness of program.

[Note; Additional procedures may be necessary in any IDLH (Immediately Dangerous to Life or Health) environment]



29 CFR 1910.134(c)

# Written Respiratory Protection Program

Federal OSHA has written a guideline on developing a Respiratory Protection Program titled:

*Small Entity Compliance Guide  
for the Revised  
Respiratory Protection Standard*



It is available on the Federal OSHA website: [www.osha.gov](http://www.osha.gov)

➤ It contains a sample written program in its appendices.

# A Written Respiratory Protection Program Addressing All Elements is Required:

- When a respirator is being used by an employee to provide protection against an air contaminant level exceeding the PEL, an oxygen deficient atmosphere, or an IDLH exposure level.
- or,
- When the employer has mandated respirator use by an employee, regardless of the employee's exposure level to the above conditions.

# Voluntary Use Of Respirators

## 29 CFR 1910.134(c)(2)

- When an employee is provided a respirator to use by the employer, or is allowed to bring in his/her own respirator to use, and the use is not required to protect against an exposure exceeding the PEL and the employer has not mandated the use of a respirator, the employer is required to:
  - (1) Provide the employee voluntarily using the respirator with the information contained in Appendix D of the Respiratory Protection Standard (29 CFR 1910.134), and

# Voluntary Use Of Respirators

## 29 CFR 1910.134(c)(2)(continued)

(2) Establish and implement those elements of a written Respiratory Protection Program that will ensure that the employee using the respirator voluntarily is medically able to use that respirator, and that the respirator is cleaned, stored, and maintained so that its use does not present a health hazard to the user.

Exception: Employers are not required to include in a written Respiratory Protection Program those employees whose only use of respirators involves the voluntary use of filtering facepieces (dust masks).

# Selection of Respirators General Requirements - 29 CFR 1910.134(d)(1)

- Appropriate for the hazard(s) the wearer will encounter.
- Must be NIOSH certified.
- The employer shall evaluate the respiratory hazards in the workplace, including a reasonable estimate of the level of exposure of the employee, the chemical state and physical form (If not possible, the employer shall consider the atmosphere IDLH).
- Must be selected from a sufficient number of models and sizes so that the respirator is acceptable to, and correctly fits, the user.

# Selection of Respirators for IDLH Atmospheres - 29 CFR 1910.134(d)(2)

- Full facepiece pressure demand self-contained breathing apparatus (SCBA) certified by NIOSH for a minimum service life of 30 minutes.
- or
- Combination full facepiece pressure demand supplied air respirator (SAR) with auxiliary self-contained air supply.

Note: Oxygen deficient atmospheres shall be considered IDLH.

# Self-Contained Breathing Apparatus (SCBA)





Combination Full  
Facepiece  
Pressure Demand  
Supplied Air  
Respirator (SAR)  
with Auxiliary  
Self-Contained  
Air Supply





# Selection of Respirators for Atmospheres that are not IDLH – 29 CFR 1910.134(d)(3)(i) & (ii)

- The employer shall provide a respirator that is adequate to protect the health of the employee and ensure compliance with all other OSHA statutory & regulatory requirements
- The respirator shall be appropriate for the chemical state and physical form of the contaminant.

# Selection of Respirators for Protection against Gases & Vapors in Atmospheres that are not IDLH –

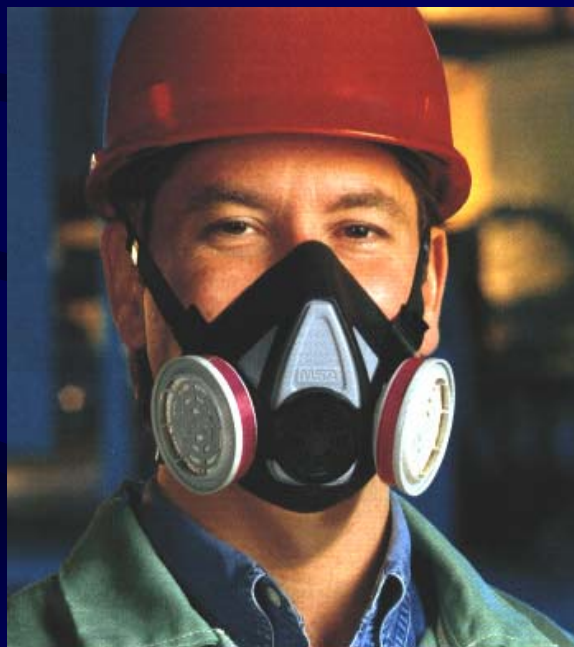
29 CFR 1910.134(d)(3)(iii)(A)

Atmosphere-  
Supplying  
Respirator  
(see manufacturer's  
info for protection  
factors)



# Selection of Respirators for Protection against Gases & Vapors in Atmospheres that are not IDLH – 29 CFR 1910.134(d)(3)(iii)(B)

Air-Purifying  
Respirator  
with cartridges  
or canisters  
approved for the  
contaminant.



Half-Mask  
(to 10X PEL)



Full Face-Mask  
(to 50X PEL)

# Selection of Respirators for Protection against Gases & Vapors in Atmospheres that are not IDLH – 29 CFR 1910.134(d)(3)(iii)(B)(1)

The respirator must have  
an End-of-Service-Life-  
Indicator (ESLI) certified  
by NIOSH for the  
contaminant of concern,  
or



# Selection of Respirators for Protection against Gases & Vapors in Atmospheres that are not IDLH –

## 29 CFR 1910.134(d)(3)(iii)(B)(2)

If there is no ESLI appropriate for conditions, the employer must implement a change schedule for canisters and cartridges that is based upon objective information or data that will ensure that canisters or cartridges are changed before the end of their service life, and include that information or data in the written Respiratory Protection Program. The employer may want to enlist the assistance of the manufacturer of the respirator to make the determination of cartridge or canister service life.

# Selection of Respirators for Protection against Particulates in Atmospheres that are not IDLH –

29 CFR 1910.134(d)(3)(iv)(A)

Atmosphere-  
Supplying  
Respirator  
(see manufacturer's  
info for protection  
factors)





# Selection of Respirators for Protection against Particulates in Atmospheres that are not IDLH –

29 CFR 1910.134(d)(3)(iv)(B)

An Air-Purifying  
Respirator with a Filter  
certified by NIOSH under  
30 CFR Part 11 as a high-  
efficiency filter,  
or



Half Mask with P 100 filter  
(to 10X PEL)

# Selection of Respirators for Protection against Particulates in Atmospheres that are not IDLH –

29 CFR 1910.134(d)(3)(iv)(B)

Air-Purifying  
Respirator  
equipped with a  
filter certified for  
particulates by  
NIOSH under 42  
CFR Part 84





# Filtering Facepiece Respirators

A negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.



Filtering Facepiece (Dust Mask)  
(to 10X PEL)

# Particulate Filter Ratings

## Alphabetic Designation:

N	=	not oil resistant
R	=	oil resistant
P	=	oil proof

## Numeric Designation:

95	=	95 % efficient in filtering particulate of 0.3 microns in size.
99	=	99 % efficient in filtering particulate of 0.3 microns in size.
100	=	99.97 % efficient in filtering particulate of 0.3 microns in size (HEPA rating).

# Particulate Filter Ratings

Oil  
Resistance

N

R

P

95

N 95

R 95

P 95

Filter  
Efficiency

99

N 99

R 99

P 99

100

N 100

R 100

P 100

	N	R	P
95	N 95	R 95	P 95
99	N 99	R 99	P 99
100	N 100	R 100	P 100

# Medical Evaluations

## 29 CFR 1910.134(e)

- Employer must provide for a medical evaluation to determine the employee's ability to use the respirator while performing the work activity in the workplace conditions, before fit testing is conducted and the respirator is to be used.
- The employer must identify a physician or other licensed health care professional (PLHCP) to perform medical evaluations using a medical questionnaire or an initial medical examination that obtains the same information.

# Medical Evaluations (continued)

## 29 CFR 1910.134(e)

- The medical evaluation must obtain the information requested by the questionnaire in Sections 1 and 2, Part A of Appendix C of 29CFR1910.134.
- A follow-up medical examination is required for an employee who gives a positive response to any question among questions 1 through 8 in Section 2, Part A of Appendix C, or whose initial medical examination demonstrates the need for a follow-up medical examination

# Medical Evaluations (continued)

## 29 CFR 1910.134(e)

- At a minimum, employer must provide additional medical evaluations if:
  - Employee reports medical signs or symptoms related to the ability to use a respirator,
  - PLHCP, supervisor, or program administrator informs the employer that an employee needs to be re-evaluated,
  - Information from the respirator program, including observations made during fit testing and program evaluation, indicates a need, or
  - Changes occur in workplace conditions that may substantially increase the physiological burden on an employee.

# Fit Testing

## 29 CFR 1910.134(f)

- Before an employer may be required to use any respirator with a negative or positive pressure tight-fitting facepiece, the employee must be fit tested on the same make, model, style and size of the respirator to be used.
- Facial hair in the area where the respirator seals against the face is not allowed. It will cause failure in the fit test.

# Fit Testing

## 29 CFR 1910.134(f)

- Employees using tight-fitting facepiece respirators must pass an appropriate qualitative fit test (QLFT) or quantitative fit test (QNFT):
  - prior to initial use,
  - whenever a different respirator facepiece (size, style, model or make) is used, and
  - at least annually thereafter.



# Qualitative Fit Testing (QLFT)

- A pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to a test agent.
- The fit test must be administered using an OSHA-accepted QLFT contained in Appendix A of 29 CFR 1910.134:

## QLFT Protocols:

- Isoamyl acetate (Odor – Banana Oil)
- Saccharin (Taste - Sweet)
- Bitrex (Taste - Bitter)
- Irritant smoke (Irritant to Respiratory Tract)



# Qualitative Fit Testing (QLFT)

- Qualitative Fit Testing:
  - Only for negative pressure air-purifying respirators that must achieve a fit factor of 100 or less.
  - Typically done in a hood.
  - Employee goes through variety of exercises to:
    - Confirm adequate fit
    - Confirm proper use

# Quantitative Fit Testing (QNFT)

- An assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.
- It determines a fit factor, a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio:

$$\frac{\text{Concentration of a substance in ambient air}}{\text{Concentration inside the respirator when worn}}$$



# Quantitative Fit Testing (QNFT)

- A QNFT must be administered using an OSHA-accepted QNFT protocol contained in Appendix A of 29 CFR 1910.134:

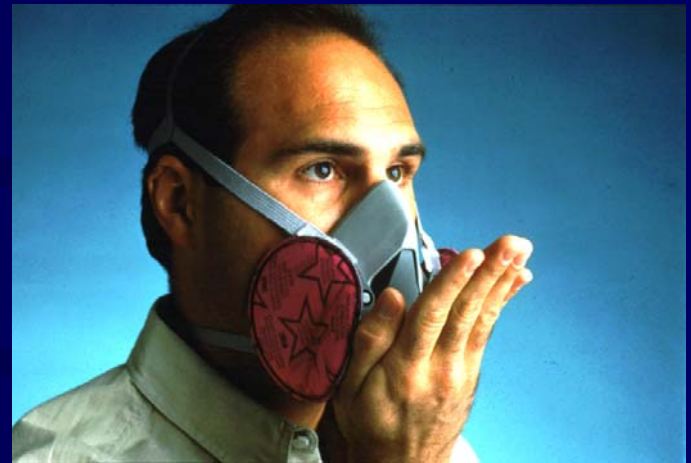
## QNFT Protocols:

- Generated Aerosol (corn oil, salt, DEHP)
- Condensation Nuclei Counter (PortaCount)
- Controlled Negative Pressure (Dynatech FitTester 3000)

# Use of Respirators

## 29 CFR 1910.134(g)(1)

- Respirators with tight-fitting facepieces must not be worn by employees who have facial hair or any condition that interferes with the face-to-facepiece seal or valve function.
- Corrective glasses or goggles or other PPE must be worn in a manner that does not interfere with the face-to-facepiece seal.
- Employees wearing tight-fitting respirators must perform a user seal check each time they put on the respirator using the procedures in Appendix B-1, or equally effective manufacturer's procedures.



# Use of Respirators

## 29 CFR 1910.134(g)(2)

To ensure continuing respirator effectiveness:

- The employer must maintain appropriate surveillance of work area conditions and degree of exposure or stress; and re-evaluate the respirator's effectiveness when it may be affected by any changes.
- Employees must leave the respirator use area:
  - to wash their faces and respirator facepieces as necessary
  - if they detect vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece
  - to replace the respirator or filter, cartridge, or canister
- If employee detects vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece, employer must replace or repair the respirator before allowing employee to return to the work area.



# Use of Respirators (in IDLH Atmospheres)

## 29 CFR 1910.134(g)(3)

- One employee or, when needed, more than one employee must be located outside the IDLH atmosphere.
- Visual, voice, or signal line communication must be maintained between employees inside and outside.
- Employees located outside must be trained and equipped to provide effective emergency rescue.
- Employer or authorized designee must be notified before any employee outside the IDLH atmosphere enters to provide emergency rescue.
- Employer or authorized designee, once notified, must provide necessary assistance appropriate to the situation.

# Use of Respirators (in IDLH Atmospheres)

## 29 CFR 1910.134(g)(3)

- Employees located outside the IDLH atmosphere must be equipped with:
  - a pressure demand or other positive pressure SCBA or SAR with auxiliary SCBA; and either.
  - appropriate retrieval equipment for removing employees who enter, where retrieval equipment would contribute to the rescue of employees and would not increase the overall risk resulting from entry; or
  - equivalent means for rescue where retrieval equipment is not required per above.



# Use of Respirators (Interior Structural Firefighting) 29 CFR 1910.134(g)(4)

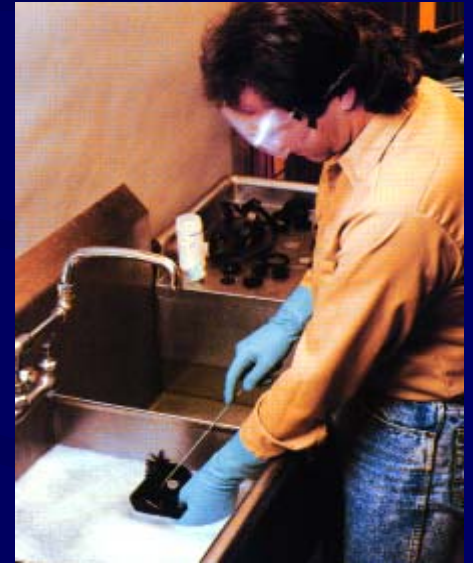
In addition to the procedures for respirator use in IDLH atmospheres, in interior structural fires:

- At least two employees must enter and remain in visual or voice contact with one another at all times.
- At least two employees must be located outside.
- All employees engaged in interior structural firefighting must use SCBA's.
- One employee located outside may be assigned an additional role (e.g., incident commander), so long as this doesn't interfere with their assistance or rescue activities.
- This standard does not preclude firefighters from performing emergency rescue before an entire team has assembled.

# Maintenance and Care of Respirators

## 29 CFR 1910.134(h)(1)

- Provide each user with a respirator that is clean, sanitary and in good working order.
- Use procedures in Appendix B-2 or equivalent manufacturer's recommendations.
- Clean and disinfect at the following intervals:
  - as often as necessary when issued for exclusive use.
  - before being worn by different individuals when issued to more than one employee.
  - after each use for emergency respirators and those used in fit testing and training.



# Maintenance and Care of Respirators

## 29 CFR 1910.134(h)(2)

- Storage of Respirators:
  - Stored to protect from damage.
  - Stored to protect from contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals.
  - Stored to prevent deformation of facepiece & valves.
  - Emergency Respirators must also be:
    - Kept accessible to the work area;
    - Stored in compartments or in covers that are clearly marked as containing emergency respirators, and
    - Stored in accordance with the manufacturer's instructions.

# Maintenance and Care of Respirators

## 29 CFR 1910.134(h)(3)

- Inspection
  - For routine use, before each use and during cleaning.
  - Emergency Respirators – monthly & in accordance with manufacture's recommendations.
  - Emergency Escape-Only Respirators – before being carried into the workplace for use.
  - Inspections must include:
    - Respirator function
    - Tightness of connections
    - Condition of components
    - Check of elastomeric parts for pliability or deterioration

# Maintenance and Care of Respirators

## 29 CFR 1910.134(h)(4)

- Repair of Respirators:
  - If failing an inspection, or otherwise found to be defective, respirators must be discarded or repaired.
  - Repairs can only be made by trained individuals using the respirator manufacturer's NIOSH-approved parts.
  - Repairs must meet manufacture's recommendations & specifications.

# Identification of Filters, Cartridges, and Canisters

## 29 CFR 1910.134(j)

- All filters, cartridges and canisters used in the workplace must be labeled and color coded with the NIOSH approval label.
- The label must not be removed and must remain legible.
- “TC number” is no longer on cartridges or filters (Part 84).
- Marked with “NIOSH”, manufacturer’s name and part number, and an abbreviation to indicate cartridge or filter type (e.g., N95, P100, etc.).



# Training and Information

## 29 CFR 1910.134(k)

- Employees who are required to use respirators must be trained so that they can demonstrate knowledge of at least:
  - why the respirator is necessary and how improper fit, use, or maintenance can compromise its protective effect.
  - limitations and capabilities of the respirator.
  - effective use in emergency situations.
  - how to inspect, put on and remove, use and check the seals.
  - maintenance and storage.
  - recognition of medical signs and symptoms that may limit or prevent effective use.
  - general requirements of this standard.

# Training and Information

## 29 CFR 1910.134(k)

- Training must be provided prior to use, unless acceptable training has been provided by another employer within the past 12 months.
- Retraining is required annually, and when:
  - changes in the workplace or type of respirator render previous training obsolete,
  - there are inadequacies in the employee's knowledge or use,
  - any other situation arises in which retraining appears necessary.
- The basic advisory information in Appendix D must be provided to employees who wear respirators when use is not required by this standard or by the employer (Voluntary use of respirators).



# Program Evaluation

## 29 CFR 1910.134(1)

- Employer must conduct evaluations of the workplace as necessary to ensure effective implementation of the program.
- Employer must regularly consult employees required to use respirators to assess their views on program effectiveness and to identify and correct any problems

Factors to be assessed include, but are not limited to:

- respirator fit (including effect on workplace performance)
- appropriate selection
- proper use
- proper maintenance

# Recordkeeping

## 29 CFR 1910.134(m)

- Records of medical evaluations must be retained and made available per 29 CFR 1910.1020.
- A record of fit tests must be established and retained until the next fit test is administered
- A written copy of the current program must be retained.
- Written materials required to be retained must be made available upon request to affected employees and OSHA.

# Dates

## 29 CFR 1910.134(n)

- This standard had an original effective date of April 8, 1998.
- Employers must now meet all requirements set forth in this standard.

# Appendices

## 29 CFR 1910.134(o)

### Appendices

A: Fit Testing Procedures

B-1: User Seal Checks

B-2: Cleaning Procedures

C: Medical Questionnaire

D: Information for Employees Wearing Respirators When Not Required Under the Standard

Compliance with Appendix A, Appendix B-1, Appendix B-2, and Appendix C are mandatory. Appendix D of this section is non-mandatory.

# QUESTIONS?

